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Lights and Retroreflective Material for Life Preservers and Other Lifesaving Equipment

DEPARTMENT OF TRANSPORTATION

Coast Guard

46 CFR Parts 25, 33, 35, 75, 78, 94, 97, 108, 109, 161, 164, 167, 180, 185, 192, 196

[CGD 76-028]

Lights and Retroreflective Material for Life Preservers and Other Lifesaving Equipment

AGENCY: Coast Guard, DOT.

ACTION: Final rules.

SUMMARY: These regulations require that life preservers carried on most vessels engaged in ocean, coastwise, or Great Lakes service be equipped with approved personal flotation device lights and retroreflective material. The regulations also require life preservers carried on vessels engaged in lakes, bays, sounds, or river service to have approved retroreflective material. The regulations are based upon recommendations resulting from investigations of four vessel casualties and upon a Coast Guard study entitled "Comparative Evaluation of Visual Distress Signals". The recommendations were that life preservers be provided with lights for use in locating survivors of vessel casualties, and in the most recent investigation a recommendation was made that life preservers be provided with retroreflective material. Use of lights and retroreflective material should significantly increase the probability of detecting survivors of vessel casualties at night.

EFFECTIVE DATE: These amendments become effective on August 1, 1979.

ADDRESSES: 1. As explained more fully below, comments on these rules may be submitted to Commandant (G-CMC/81), (CGD 76-28), U.S. Coast Guard, Washington, D.C. 20590.

2. The Final Evaluation for these regulations, comments received on the regulations, and copies of the related Coast Guard study and the standards incorporated by reference into these regulations are available for examination and copying at the Marine Safety Council (G-CMC/81), Room 8117, Department of Transportation, Nassif Building, 400 Seventh Street, SW., Washington, D.C. 20590.

FOR FURTHER INFORMATION CONTACT: Commander John P. Deleonardis, Office of Merchant Marine Safety (G-MVI-2/83), Room 8300, Department of Transportation, Nassif Building, 400 Seventh Street, SW., Washington, D.C. 20590 (202-426-2183).

SUPPLEMENTARY INFORMATION: On May 23, 1977, the Coast Guard published a notice of proposed rule making in the **Federal Register** for these regulations (42 FR 26229). A supplemental notice of proposed rule making was also published in the **Federal Register** of September 12, 1977 (42 FR 45694). The supplemental notice proposed certain additions and revisions to the May 23 notice and announced a public hearing on the proposals which was subsequently held in Washington, D.C., on September 30, 1977. The comment period on the rule making closed on November 4, 1977, and a total of 47 written comments were received.

Final Evaluation

1. These regulations are considered to be "nonsignificant" and, accordingly, a final evaluation has been prepared as required by the Regulatory Policies and Procedures of the Department of Transportation (44 FR 11040-11045). The DOT Order requires that each evaluation include an economic analysis which quantifies, to the extent practicable, the estimated cost of the regulations to the private sector, consumers, and Federal, State and local governments, as well as the anticipated benefits and impacts of the regulations.

2. The impact of administering the approval programs and checking for compliance with the carriage, installation, and replacement requirements will be absorbed with existing Coast Guard resources. Total costs of equipping life preservers with PFD lights and retroreflective material are expected to be approximately $3,070,000. Annual replacement costs are expected to be approximately $920,000.

3. The principal economic benefits resulting from the use of lights and retroreflective material on life preservers will be those associated with the number of additional lives saved in vessel casualties. Coast Guard data compiled concerning search and rescue incidents in 1978 indicates that approximately 500 incidents involving commercial vessels or their occupants occurred in which night searches were conducted without success in locating a search target. Use of lights and retroreflective material required by these regulations should significantly increase the probability of detecting survivors of vessel casualties at night.

Drafting Information

The principal persons involved in drafting these regulations are: Lieutenant Commander Paul K. Anderson and Robert L. Markle, Office of Merchant Marine Safety, and William R. Register, Office of the Chief Counsel.

Discussion of the Regulations and Their Applicability

1. These regulations apply, with certain exceptions, to all vessels that are inspected under the provisions of Title 46, Code of Federal Regulations. This includes tank vessels, passenger vessels, cargo and miscellaneous vessels, mobile offshore units, nautical school ships, small passenger vessels (under 100 gross tons), and oceanographic vessels. However, these regulations do not apply to most foreign vessels. As explained in the general provisions of the regulations in Title 46, foreign vessels that are inspected by their own governments are not normally required to comply with those regulations. (*See, e.g.,* §§ 30.01-5, 70.05-3, 90.05-1, and 175.05-3 of Title 46.)

2. These regulations also apply to commercial uninspected vessels, including those carrying six or less passengers for hire. The lifesaving equipment regulations for commercial uninspected vessels are contained in Part 25 of Title 46. Part 25 allows these vessels a choice of carrying different types of life preservers.

3. The regulations require vessels engaged in ocean, coastwise, or Great Lakes service, except ferries and small passenger vessels, to have personal flotation device lights (PFD lights) on life preservers carried on board. The possibility that survivors of a casualty to one of these vessels could drift from the scene of the casualty before the arrival of help is always present because of the response time of search and rescue units for the areas in which these vessels operate. Use of PFD lights can aid in detection of survivors in these cases. As discussed in more detail below, ferries and certain small passenger vessels are not required to have PFD lights because of the limited routes and areas of operation of these vessels.

4. The regulations also require use of retroreflective material on life preservers. This requirement applies to vessels in all services including vessels in lakes, bays, sounds, or rivers service as well as vessels in ocean, coastwise, or Great Lakes service. Survivors of a casualty to a vessel in lakes, bays, sounds, or river service would in all probability not drift far from the scene of the casualty before the arrival of help. These vessels operate in areas that generally are within close range of search and rescue units or other vessels,

and retroreflective material can provide effective assistance in detection of survivors in these cases. Use of retroreflective material on life preservers of vessels in other services will also provide survivor detection capability in addition to detection capabilities afforded by PFD lights.

5. The amendments to Parts 161 and 164 contain approval specifications for lights used on personal flotation devices and for retroreflective material used on lifesaving equipment. Section 489 of Title 46, U.S. Code, requires that these items be approved by the Coast Guard; and these specifications set out design requirements, approval tests, and procedures for obtaining approval.

6. The specification in Part 164 for retroreflective material applies to all types of lifesaving equipment. Currently, the only requirements to use retroreflective material are the requirements in these regulations to use Type I material. Requirements to use Type I or Type II material on other types of lifesaving equipment may be proposed in the future.

7. The Coast Guard will begin accepting applications for approval of PFD lights and retroreflective material on the publication date of these regulations.

8. These regulations, upon becoming effective, will apply both to existing vessels and to vessels built after the effective date of the regulations. However, as discussed in more detail below, compliance with the carriage and installation requirements is being postponed until one year after the regulations are published in the **Federal Register**.

9. The regulations are based upon recommendations of the National Transportation Safety Board and marine boards of investigation involving the casualties to the SS Panoceanic Faith, MV Theresa F., F/V Fenwick Island, and SS C.V. Sea Witch—Esso Brussels, and upon the results of a study entitled "Comparative Evaluation of Visual Distress Signals" (Report No. CGD 47–78, dated August 1976). The specifications are also based in part upon Federal Specification L–S–300B entitled "Sheeting and Tape, Reflective: Nonexposed Lens, Adhesive Backing", and upon the other industry and Federal standards incorporated by reference into the specifications.

Discussion of Comments and Changes Made

A. General

1. Forty-seven comments were received in this rulemaking, in addition to oral comments presented at the public hearing. Most commenters addressed the carriage, installation, and replacement requirements. The principal concerns were with the cost and reliability of lights, stowage and theft problems associated with the carriage of lights, and the need and justification for making the regulations applicable to specific categories of vessels. These comments and the action taken on them are discussed in more detail below. Five technical comments were also received on each of the equipment specifications, and are likewise discussed in the following paragraphs.

2. The final rules contain various changes that have been made in response to comments received, and on the basis of further analysis of the proposed rules within the Coast Guard. Most of the changes were minor in nature or were made in order to improve certain requirements or to delete rules that were shown to be arbitrary or unnecessarily rigorous. None of the changes will significantly increase the cost of equipment or of approval and production testing.

3. Although a public comment period has already been provided in this rulemaking, an additional opportunity for comments, principally on the changes made, is nevertheless desirable to assure that the rules as revised represent workable and reasonable requirements and procedures. Accordingly, persons wishing to comment may do so by submitting written comments to the address listed in the ADDRESSES section of this preamble. Commenters should include their names and addresses, identify the docket number of this rulemaking (CGD 76–28) and give reasons for the comments. Based upon comments received, the regulations may be further revised or additional regulations may be issued.

B. Carriage, Installation, and Replacement

1. Four commenters recommended that work vests not be required to have PFD lights and retroreflective material. Neither the proposed nor the final regulations applies to work vests. Section 25.25–13 refers to "buoyant vests." However, these are approved under Subparts 160.047, 160.052, and 160.060 of Title 46. Work vests are approved under Subpart 160.053 of Title 46.

2. Six commenters were concerned that the regulations do not apply to recreational boats. Visual detection devices for recreational boats are being considered in separate rule making. Notices of proposed rule making concerning the carriage of visual distress signals on recreational boats were published in **Federal Register** editions of April 10, 1978 (43 FR 15118) and October 23, 1978 (43 FR 49451).

3. Three commenters stated that adding PFD lights to life preservers would create a stowage problem on smaller vessels because of difficulty in building larger storage boxes to accommodate them. The Coast Guard has reviewed several PFD light designs and none of them are large enough to pose stowage problems. It is noted in this regard, however, that a maximum size limitation has been added to the final rules as a new § 161.012–7(h).

4. Seven commenters stated that pilferage of lights by passengers would be a problem. Life preservers are normally stowed in closed lockers, closets, and boxes, all of which are in plainly visible locations. An attempt at theft would be difficult in such locations. Also, the attempt would be complicated by the fact that, as required by these regulations, each light will be securely fastened to a life preserver.

5. Four commenters stated that the cost of PFD lights and retroreflective material would be excessive. One of the commenters also questioned the installation and maintenance costs. The cost of retroreflective material will be approximately $3.00 per life preserver. Additionally, annual replacement costs are expected to be about $0.70 per life preserver, assuming a 5 year lifetime for material. The cost of PFD lights is expected to be approximately $3.00 per light, assuming that inexpensive lights are selected for vessel use. It is expected that most lights will have to be replaced on a three year schedule, and that replacement costs will be about $1.00 per year per life preserver. The Final Evaluation contains additional discussion of the costs involved with these regulations.

6. Five commenters stated that PFD lights are an unnecessary expense for vessels that operate during daylight hours only and, therefore, want exemptions for these vessels. These comments have not been adopted. Searches for surviviors of vessels that operate in daylight hours only could quite possibly extend into nighttime, thus, making the availability of PFD lights on these vessels highly desirable.

7. Two commenters questioned the need for making the regulations apply to white water, river running rafts. The Coast Guard is currently preparing regulations concerning white water rafts and the need for visual detection

requirements on these craft will be considered in that rule making.

8. Four commenters questioned the reliability of battery powered PFD lights after exposure to environmental conditions during stowage on board ship. Two principal reasons for light failure are unreliable power sources and physical damage to the light. Although care in handling and stowage can prevent physical damage, unreliable power sources are nevertheless a continuing possibility. Revisions have been made in the final rules, however, to improve the reliability of power sources. Section 161.012–7(c) and the corresponding operations requirements, as revised in the final rules, require replacement of a light or its power source on or before the date that the power source reaches one half of its storage life; whereas, the proposed rules required a storage life of at least three years with replacement within three years after the power source was manufactured. Section 161.012–3(b) also clarifies the term "storage life" as it was used in the proposed rules. These revisions are based on similar requirements that apply to power sources required for Coast Guard approved emergency position indicating radio beacons (EPIRB's). Subpart 161.011 of Title 46 contains the EPIRB approval procedures.

It is recognized that a small percentage of lights that are designed to meet the construction and performance requirements in these regulations could nevertheless prove to be unreliable in service; and, accordingly, the testing requirements in § 161.012–13 provide for regular production testing to improve reliability. Also the Coast Guard plans to institute an inspection program for randomly testing PFD lights after they have been in service for varying periods in order to provide a further check on reliability.

9. One commenter recommended adding requirements that batteries in PFD lights be tested during each abandon ship drill. This recommendation has not been adopted. Many battery powered lights are designed for single use and, thus, would have to be replaced after activation. Lights with batteries that can be used more than once would have their effective lives shortened by frequent testing because of resulting battery and bulb deterioration.

10. Several commenters stated that the regulations should not apply to ferries and small passenger vessels. The principal reasons provided in support were that (1) the costs involved in complying with the regulations would far outweigh any safety benefits involved, and (2) PFD lights and retroreflective material are not needed on these vessels since they operate on established, well traveled routes and other vessels would be able to provide assistance in the event of a major casualty. The final rules have been partially modified in accordance with these comments to allow ferries and small passenger vessels certificated only for limited routes (i.e., routes not extending more than 20 miles from a harbor of safe refuge) to operate without PFD lights. However, the requirement to have retroreflective material for life preservers on these vessels has been retained. As explained in the Discussion of the Regulations, retroreflective material can provide effective assistance in detection of survivors on all vessels regardless of the service in which they are engaged. The costs to comply with the regulations should nevertheless be reduced substantially for ferries and small passenger vessels on limited routes because of the relaxed carriage requirements for PFD lights.

11. Two commenters recommended that the date for complying with the carriage and installation requirements be extended beyond the one year postponement adopted in the final rules. One commenter recommended a 5 year delay in order to provide sufficient time to replace life preservers currently in use with those having retroreflective material attached. The other commenter recommended a postponement of one year or until a vessel's next inspection, whichever occurs later, in order to give sufficient time for vessels in overseas service to comply with the regulations. These comments have not been adopted. PFD lights and retroreflective material will be readily available and capable of attachment to existing life preservers. Accordingly, a postponement of more than one year is not warranted.

12. Seven comments were received questioning whether adding retroreflective material to life preservers would reduce their buoyancy. The material will be light enough as to have little or no effect on buoyancy.

C. *PFD Light Specification*

1. *Sections 161.012–5 and 161.012–11(a).* The Coast Guard has recently proposed general approval procedures, production inspection and test procedures, and standards for accepting independent laboratories for testing certain equipment requiring Coast Guard approval. These proposed procedures were published in the **Federal Register** of October 23, 1978 (43 FR 49440–45). The procedural rules in § 161.012–5 for approving PFD lights are either included in or are consistent with the general procedures published on October 23, 1978. The general procedures, however, contain additional provisions which are not included in the approval procedures for PFD lights. In particular, the general procedures also contain recordkeeping and annual reporting provisions, standards for testing laboratories in addition to the standards in § 161.012–11(a), and provisions describing in detail the contents of equipment plans and tests reports submitted during the application process. These additional procedures, when adopted as final rules, will also apply to approval process for PFD lights. A copy of the proposed general procedures published on October 23, 1978, may be obtained from the Commandant (G–MMT–3/83) at the address listed under *ADDRESSES* in this preamble.

2. *Section 161.012–7(b).* One commenter recommended adding requirements that PFD lights be designed with non-replaceable power sources, and that they be designed for permanent attachment to a PFD. These recommendations have not been adopted. Section 161.012–7(b) requires that a light and its power source be designed to be removed and replaced without causing damage to the PFD. The purpose of this requirement is to allow replacement of a light or power source without having to discard the PFD.

3. *Section 161.012–7(c).* One commenter recommended that the 3 year minimum storage life required by proposed § 161.012–7(c) for the power source of a PFD light be reduced to one year in order to allow a wider selection of batteries and a wider range of options for the user. As explained previously, § 161.012–7(c) has been revised in the final rules to require that the expiration date of a light's power source be one half of its storage life. This requirement, as revised, allows selection of power sources (preferably high performance power sources), that have relatively short useful lives, as well as power sources that are satisfactory for much longer periods.

4. *Section 161.012–7(d).* One commenter recommended that the requirement in proposed § 161.012–7(d) that each PFD light be capable of preventing leakage of chemicals from its container should be limited to periods of storage since some water activated lights do discharge chemicals when they are operating. This was the intent of proposed § 161.012–7(d) and the final rule has been clarified accordingly. Chemicals discharged in storage could

damage the PFD, but when the light is operating in the water the chemicals become sufficiently diluted as not to be harmful.

5. *Section 161.012–7(g).* Two commenters recommended adding a requirement specifying the directions in which a PFD light should be capable of being seen. One commenter suggested all directions in the upper hemisphere or all directions in a horizontal plane. The other suggested 180° above and 360° in a horizontal plane. Section 161.012–7(g) contains a requirement that each light be designed so that when attached to a PFD its light beam, at a minimum, is visible in an arc of 180° above or in front of the wearer. This requirement was proposed in the supplemental notice of proposed rule making. As explained in the supplemental notice, tests were conducted by the Coast Guard in May 1977 at Coast Guard Air Station, Elizabeth City, North Carolina, to determine the effectiveness of various types of lights. The tests showed that lights meeting the arc of visibility requirement in § 161.012–7(g) were adequate to allow detection by observers in simulated search situations. Accordingly, requiring different or additional arcs of visibility would be unnecessary.

6. *Section 161.012–7(h).* Two commenters recommended adding a maximum size limit for PFD lights. One commenter suggested a 150 mm (6 in.) length and a 75 mm (3 in.) diameter. The other suggested dimensions of 60 mm (2.4 in.) by 60 mm by 200 mm (8 in.). The Coast Guard has reviewed the designs of several lights and has not found any of them to be oversized. However, in order to preclude future use of oversized lights, § 161.012–7(h) has been added in the final rules to require that each light and its power source be capable of fitting into a cylindrical space that is 150 mm long and 75 mm in diameter.

7. *Section 161.012–7(i).* One commenter recommended adding an upper weight limit of 200 g (7 oz.) for lights. The light designs reviewed by the Coast Guard were all of lights under 225 g (8 oz.). This upper weight limit is considered reasonable and should not materially affect the buoyancy of a PFD. In order to preclude future use of lights of abnormal weight, an upper weight limit of 225 g. is imposed in § 161.012–7(i) of the final rules.

8. *Section 161.012–7(j).* Two commenters recommended adding a requirement for PFD lights to be attached to PFD's by means of lanyards. One commenter suggested a minimum length of 450 mm (18 in.) and the other suggested 600 mm (24 in.). These comments have been adopted but with some modification. Section 161.012–7(j), as added in the final rules, requires that each light designed to operate while detached from a PFD must have a lanyard of at least 750 mm (30 in.) in length. The longer lanyard length was chosen as the minimum length needed to allow a PFD wearer to hold the light at arm's length in order to help draw the attention of a searcher.

9. *Sections 161.012–7(k) and 161.012–9(b).* One commenter recommended adding a requirement that the freeboard of a PFD light be at least 40 mm (1.5 in.), presumably to ensure that the light when floating in water can at least be seen at a distance of one nautical mile away as required by § 161.012–9(b). This recommendation has been adopted in part and incorporated into § 161.012–7(k). Section 161.012–7(k) has been added to the final rules to require that each light designed to operate while detached from a PFD must be capable of floating in water with its light source at or above the surface of the water. The purpose of this requirement is to ensure that a light, if detachable from its PFD, has the capability to remain sufficiently visible while in the water in order to allow detection from a distance. Requiring the light also to have the additional freeboard suggested by the commenter is unnecessary. The resulting increase in the visibility of the light would be negligible and would result in larger lights and additional manufacturing costs.

10. *Section 161.012–9(a).* One commenter recommended that the flash rate in proposed § 161.012–9(a) be changed from a maximum period of less than 1 second between flashes when first activated to a rate of one flash per second plus or minus 10 percent. The basis for the recommendation was that the revised flash rate would coincide with flash rates of products that are commercially available on the open market, including certain Coast Guard approved products. This recommendation has been adopted but with some modification. Section 161.012–9(a) has been revised to require a flash rate of between 50 and 70 flashes per minute. This flash rate is the same as that initially required for floating electric water lights approved under Subpart 161.010 of Title 46.

11. *Section 161.012–9(b).* One commenter recommended adding a requirement for lights to be high intensity flashing white lights in order to increase their effectiveness. This recommendation has not been adopted. Lights meeting the visibility requirement in § 161.012–9(b) are adequate to allow detection in a search and rescue operation. Requiring increased light intensity would result in a significant increase in the cost of the light.

12. *Sections 161.012–9(b) and 161.012–11(b).* One commenter recommended adding a requirement that PFD lights be designed to shine within 5 minutes after activation. This comment has been adopted but with some modification. Some lights, especially those that are water activated, can take some time to turn on and shine with full design intensity. Accordingly, § 161.012–9(b) hss been revised in the final rules to require that a light come on within 2 minutes after activation and be able to meet the visibility requirement in § 161.012–9(b) within 5 minutes after activation. Section 161.012–11(b) has also been revised to provide a check for performance during these time periods.

13. *Section 161.012–9(c).* One commenter recommended that the requirement in § 161.012–9(c) that each PFD light be designed to operate underwater continuously for eight hours should be revised to require continuous operation for at least 15 hours. This comment has not been adopted. An eight hour period should provide sufficient time in which to locate survivors in the water when taking into account the time needed to reach search areas in a search and rescue operation.

14. *Sections 161.012–9(c) and 161.012–11(c).* One commenter objected to the requirement in § 161.012–9(c) for 8 hours continuous underwater operation on the basis that some lights need a supply of air in order to operate. Lights that need a continuous supply of air cannot be successfully used as PFD lights since they will be frequently submerged when used in breaking waves. However, a light that requires only an intermittent supply of air could be successfully used in an ocean environment. Accordingly, §§ 161.012–9(c) and 161.012–11(c) have been revised in the final rules to allow their use.

15. *Sections 161.012–9(c) and 161.012–11(c).* One commenter recommended adding a requirement for lights to be capable of operating in a temperature range of 0° C. (32° F.) to 30° C. (86° F.). The commenter stated that this temperature range would take in account the varying temperatures found in a worldwide marine environment. This recommendation has been adopted, but with a modified temperature range. Sections 161.012–9(c) and 161.012–11(c) have been revised in the final rules to prescribe a temperature range of 15° ± 5° C (59° ± 9° F). Lights that can be operated in a 15° ± 5° C range over an extended period can also be

expected to operate in a 0° to 30° C range. The 15° ± 5° C range was selected in lieu of a 0° to 30° C range in order to facilitate approval testing.

16. *Section 161.012–9(d).* Section 161.012–9(d) requires that each PFD light be designed to operate both in sea water and in fresh water. One commenter recommended deletion of the requirement for operation in fresh water. This comment has not been adopted. Lights are needed on vessels operating on the Great Lakes as well as on vessels operating in salt water.

17. *Sections 161.012–9(f) and 161.012–11(c).* One commenter recommended that since storage temperatures in a marine environment are not generally controlled, PFD lights should be required to be capable of operation after storage in a temperature range of minus 40° C (−40° F) to 70° C (158° F). This comment has been adopted in § 161.012–9(f), but with a modified temperature range of minus 30° C (−22° F) to 65° C (149° F). This is the same temperature range prescribed for other lifesaving equipment currently approved by the Coast Guard. The approval test in § 161.012–11(c) has also been modified to provide a check for performance after storage at minus 30° C and 65° C.

18. *Sections 161.012–11(d) and 161.012–7(c).* Proposed § 161.012–11(d) required that individual approval tests be conducted on a sample light to determine whether the light meets the construction requirements in § 161.012–7. Testing to show compliance with the storage life requirements for power sources in § 161.012–7(c) could take several years if done properly. Accordingly, § 161.012–11(d) has been revised in the final rules to allow submission of technical data in lieu of test results in order to show compliance with § 161.012–7(c).

19. *Sections 161.012–15(b) and 161.012–7(c).* Since § 161.012–7(c), as revised, adds a requirement concerning the expiration date of the light's power source, § 161.012–15(b) has also been revised to require marking the power source with the expiration date. This marking is needed so that the user will know when the power source has to be replaced.

20. *Sections 161.012–17 and 161.012–7(a).* Section 161.012–17 has been added in the final rules to require that lights be provided with instructions on how to attach them to a PFD in a manner that complies with § 161.012–7(a). Compliance with § 161.012–7(a) might otherwise be less than uniform. In addition to requiring instructions, the Coast Guard plans to sponsor a meeting with light manufacturers and PFD manufacturers to discuss preferable methods of attaching PFD lights to life preservers. Persons desiring to attend or to be informed of the time and place of the meeting may contact Robert L. Markle at 202–426–1444 (or write to Commandant (G–MMT–3/83), U.S. Coast Guard, Washington, D.C. 20590, ATTN: Robert L. Markle.)

D. Retroreflective Material Specification

1. *Sections 164.018–5(a)(2), 164.018–11(a)(4)(iii), 164.018–11(b)(1) and 164.018–11(b)(2).* Federal Specification L–S–300B is incorporated by reference into this specification, whereas, L–S–300C was referenced in the proposed rules. Reference to L–S–300B rather than L–S–300C is necessary since L–S–330C has not yet been finalized. Changes have also been made in § 164.018–11(a)(4)(iii) and §§ 164.018–11 (b)(1) and (b)(2) to spell out test procedures in L–S–300C that were referenced in the proposed regulations but that are not in L–S–300B.

2. *Section 164.018–7.* As explained previously, the Coast Guard has recently proposed general approval procedures for testing certain equipment requiring Coast Guard approval. The procedural rules for retroreflective material are either included in or are consistent with the proposed general procedures. However, the general procedures also contain provisions describing in detail the contents of equipment plans and test reports submitted during the application process. These additional provisions, when adopted as final rules, will also apply to the approval process for retroreflective material.

3. *Table 164.018–9 and § 164.018–11(c).* Federal Specification L–S–300B and Federal Test Method Standard 370 both contain procedures for taking measurements of retroreflective materials. Since use of FTMS 370 is planned in the final version of L–S–300C, FTMS 370 terms have been added to Table 164.018–9 and § 164.018–11(c) allows the use of either L–S–300B or FTMS 370.

4. *Table 164.018–9 (reflective intensity values).* One commenter recommended that reflective intensity values of 10, 6, and 1 be prescribed in Table 164.018–9 for incidence angles of +45° in lieu of the Table values of 50, 25, and 1. The commenter stated that retroreflective material that has the reflective intensity he proposed could perform equally as well as material that has reflective intensity properties meeting the § 164.018–9 requirements, although about 75% more material would be needed per life jacket to achieve equivalent performance. This comment has not been adopted. The +45° incidence angles and corresponding reflective intensity values of 50, 25, and 1 were proposed in the supplemental notice of proposed rule making. As explained in the supplemental notice, tests conducted at Elizabeth City, North Carolina, in May 1977 showed the need for including these values in the Table. Subsequent Coast Guard testing at Elizabeth City in October 1977 showed specifically that material which has the reflective intensity proposed by the commenter could not be seen at wider angles of incidence; whereas, material meeting the reflective intensity requirements in § 164.018–9 was still clearly visible at the wider angles. The amounts and placement of material on the PFD's used in the test were as prescribed in these regulations. *See e.g.* § 33.35–25. Adding extra material in order to comply with § 164.018–9 would not be acceptable since the visible area on a PFD when worn in the water is generally not large enough to accommodate additional material. Also, the additional material would reduce the amount of the PFD's international orange surface, which is needed for purposes of daytime detection of a wearer.

5. *Table 164.018–9 (divergence angles).* One commenter recommended that the 2° divergence angles in Table 164.018–9 be increased in order to provide a check for adequate performance of material at wide divergence angles that would be encountered at sea. This comment has not been adopted. Contrary to the commenter's suggestion, wide divergence angles are not normally encountered in searches at sea because the observer is almost always near the light source used in the search.

6. *Section 164.018–9(b).* Proposed § 164.018–9(b) required that, in the case of retroreflective material designed for use with an adhesive, the "proper adhesive to be used must be stated on the material * * * or package." As revised, the rule requires that the information on all retroreflective material, or on the accompanying package, include a statement as to what surfaces the material can be attached and instructions on attaching the material to each of those surfaces. These specific instructions are needed since one adhesive (for materials requiring an adhesive) will not necessarily be adequate for all surfaces and, in the absence of instructions, material (regardless of whether it requires an adhesive) could be improperly attached

to a particular surface, thus, having diminished effectiveness.

7. *Sections 164.018–9(f), 164.018–9(e), and 164.018–9(g).* One commenter recommended that § 164.018–9(f) be revised to provide that the reflective intensity of retroreflective material must not be reduced to less than 50% of Table 164.018–9 values during testing in accordance with the "resistance to accelerated weathering" test method. The commenter stated that the intent of Federal Specification L–S–300 is that material should retain at least 50% of the reflectivity specified in the Table after accelerated weathering; whereas, the proposed rule provided that the reflective intensity of material after testing must not be reduced by more than 50% of the values listed in the Table. Section 164.018–9(f) has been revised to adopt the commenter's recommendation and similar revisions have likewise been made in §§ 164.018–9(e) and 164.018–9(g) to reflect the intent of Federal Specification L–S–300.

8. *Sections 164.018–11(a)(2) and 164.018–11(a)(6).* One commenter recommended using porous test panels in lieu of the aluminum test panels required by § 164.018–11(a)(2) when testing Type I materials in order to check for adverse effects of corrosion and weathering on the back side of material (i.e. the side of material to be applied to another surface). This comment has not been adopted. Although corrosion and weathering on the back side of material could affect the performance of the material, the test method in § 164.018–11(a)(6) provides an adequate check for these adverse effects.

9. *Section 164.018–11(b).* One commenter recommended that the requirement to cut test material be removed from the "resistance to water immersion" test method because it would cause flooding of materials not divided into cells and, thus, reduce their reflective performance during the test. This comment has not been adopted. The purpose for making cuts in the material is to simulate damage and check for retroreflective performance in a water environment after damage.

10. *Sections 164.018–11(b)(1) and 164.018–9(h).* One commenter recommended that the "resistance to water immersion" test method be revised to require that the material meet the Table 164.018–9 values for reflective intensity after 16 hours of immersion in fresh water and in salt water. This recommendation has been adopted in §§ 164.018–11(b) and 164.018–9(h). The proposed test would have required 250 hours in immersion in distilled water with no test for salt water and with no test for reflective intensity at the end of that period. The revised test is more representative of the kind of water exposure in which lifesaving equipment is expected to function.

11. *Section 164.018–11(a)(3) and 164.018–11(b)(1).* The "resistance to water immersion" test method in the proposed rules required that test material be checked at the end of the test for blistering, delamination, subsurface corrosion, or other physical deterioration which, if present after extended exposure to water, would diminish the effectiveness of any adhesive used with the material. However, the 16 hour immersion period in the revised "resistance to water immersion" test method is not long enough to check for these conditions. An equivalent test to check for occurrence of these conditions has been added to the adhesion test in § 164.018–11(a)(3).

12. *Section 164.018–11(b)(2).* One commenter recommended that the "abrasion resistance" test method be revised to require use of a brush abrasion tester in place of the abrasive wheel required by the proposed rules. This comment has been adopted in § 164.018–11(b)(2). Use of an abrasive wheel may be appropriate for certain outdoor signs which are exposed to a sandblasting effect from wind driven sand particles. However, that test method is too severe for the flexible films used in personnel safety markings.

13. *Sections 164.018–11(b)(3) and 164.018–9(j).* One commenter recommended that the proposed "solvent resistance" test be replaced with a test that would require cleaning soiled material with mineral spirits and detergent. This recommendation has been adopted in §§ 164.018–11(b)(3) and 164.018–9(j). The "solvent resistance" test is more appropriate for retroreflective material used in outdoor signs and markers, but solvents used in that test can attack the flexible materials and adhesives used in personnel safety markings. The "soil resistance and cleanability" test method adopted in the final rules provides a check on whether soiled retroreflective material can be cleaned with common cleaning liquids without being damaged.

14. *Section 164.018–11(d).* One commenter recommended that specific materials be required for the "adhesion" test method instead of the general categories of materials listed in the proposed rules so as to avoid a wide range of results in testing. This comment has been adopted in § 164.018–11(d). The specific materials are described by reference to particular military or federal specifications and, these materials are required for use in various kinds of Coast Guard approved lifesaving equipment.

In consideration of the foregoing, Title 46 of the Code of Federal Regulations is amended as follows:

SUBCHAPTER C—UNINSPECTED VESSELS

PART 25—REQUIREMENTS

1. By adding a new § 25.25–13 to Part 25 to read as follows:

§ 25.25–13 Personal flotation device lights.

(a) This section applies to vessels described in § 25.25–1 that engage in ocean, coastwise, or Great Lakes voyages.

(b) Each life preserver, each special purpose water safety buoyant device intended to be worn, and each buoyant vest carried on a vessel after June 30, 1980, must have a personal flotation device light that is approved under Subpart 161.012 of this chapter.

(c) Each light required by this section must be securely attached to the front shoulder area of the life preserver or other personal flotation device.

(d) If a personal flotation device light has a non-replaceable power source, the light must be replaced on or before the expiration date of the power source. If the light has a replaceable power source, the power source must be replaced on or before its expiration date and the light must be replaced when it is no longer serviceable.

2. By adding a new § 25.25–15 to Part 25 to read as follows:

§ 25.25–15 Retroreflective material for personal flotation devices.

(a) Each life preserver, each special purpose water safety buoyant device intended to be worn (Type III PFD), and each buoyant vest (type II PFD) carried on a vessel after June 30, 1980, must have Type I retroreflective material that is approved under Subpart 164.018 of this chapter.

(b) Each item required to have retroreflective material must have at least 200 sq. cm (31 sq. in.) of material attached to its front side, at least 200 sq. cm of material on its back side, and, if the item is reversible, at least 200 sq. cm of material on each of its reversible sides. The material is attached on each side of the item must be divided equally between the upper quadrants of the side, and the material in each quadrant must be attached as closely as possible to the shoulder area of the item.

SUBCHAPTER D—TANK VESSELS

PART 33—LIFESAVING EQUIPMENT

3. By adding a new § 33.35–20 to Part 33 to read as follows:

§ 33.35–20 Personal flotation device lights—TB/OCL.

(a) Each life preserver carried on a vessel engaged in ocean, coastwise, or Great Lakes service after June 30, 1980, must have a personal flotation device light that is approved under Subpart 161.012 of this chapter.

(b) Each light required by this section must be securely attached to the front shoulder area of a life preserver.

4. By adding a new § 33.35–25 to Part 33 to read as follows:

§ 33.35–25 Retroreflective material—TB/ALL.

(a) Each life preserver carried on a vessel after June 30, 1980, must have at least 200 sq. cm (31 sq. in.) of retroreflective material attached on its front side, at least 200 sq. cm on its back side, and at least 200 sq. cm of material on each of its reversible sides.

(b) Retroreflective material required by this section must be Type I material that is approved under Subpart 164.018 of this chapter.

(c) The retroreflective material attached on each side of a life preserver must be divided equally between the upper quadrants of the side, and the material in each quadrant must be attached as closely as possible to the shoulder area of the life preserver.

PART 35—OPERATIONS

5. By adding a new § 35.10–30 to Part 35 to read as follows:

§ 35.10–30 Personal flotation device lights—TB/OCL.

(a) Each personal flotation device light that has a non-replaceable power source must be replaced on or before the expiration date of its power source.

(b) Each replaceable power source for a personal flotation device light must be replaced on or before its expiration date and the light must be replaced when it is no longer serviceable.

SUBCHAPTER H—PASSENGER VESSELS

PART 75—LIFESAVING EQUIPMENT

6. By adding a new § 75.40–30 to Part 75 to read as follows:

§ 75.40–30 Personal flotation device lights.

(a) Each life preserver carried on a vessel engaged in ocean, coastwise, or Great Lakes service after June 30, 1980, except ferries, must have a personal flotation device light that is approved under Subpart 161.012 of this chapter.

(b) Each light required by this section must be securely attached to the front shoulder area of a life preserver.

7. By adding a new § 75.40–35 to Part 75 to read as follows:

§ 75.40–35 Retroreflective material.

(a) Each life preserver carried on a vessel after June 30, 1980, must have at least 200 sq. cm (31 sq. in.) of retroreflective material attached on its front side, at least 200 sq. cm on its back side, and at least 200 sq. cm of material on each of its reversible sides.

(b) Retroreflective material required by this section must be Type I material that is approved under Subpart 164.018 of this chapter.

(c) The retroreflective material attached on each side of a life preserver must be divided equally between the upper quadrants of the side, and the material in each quadrant must be attached as closely as possible to the shoulder area of the life preserver.

PART 78—OPERATIONS

8. By adding a new § 78.17–90 to Part 78 to read as follows:

§ 78.17–90 Personal flotation device lights.

(a) Each personal flotation device light that has a non-replaceable power source must be replaced on or before the expiration date of its power source.

(b) Each replaceable power source for a personal flotation device light must be replaced on or before its expiration date and the light must be replaced when it is no longer serviceable.

SUBCHAPTER I—CARGO AND MISCELLANEOUS VESSELS

PART 94—LIFESAVING EQUIPMENT

9. By adding a new § 94.40–20 to Part 94 to read as follows:

§ 94.40–20 Personal flotation device lights.

(a) Each life preserver carried on a vessel engaged in ocean, coastwise, or Great Lakes service after June 30, 1980, must have a personal flotation device light that is approved under Subpart 161.012 of this chapter.

(b) Each light required by this section must be securely attached to the front shoulder area of a life preserver.

10. By adding a new § 94.40–25 to Part 94 to read as follows:

§ 94.40–25 Retroreflective material.

(a) Each life preserver carried on a vessel after June 30, 1980, must have at least 200 sq. cm (31 sq. in.) of retroreflective material attached on its front side, at least 200 sq. cm on its back side, and at least 200 sq. cm of material on each of its reversible sides.

(b) Retroreflective material required by this section must be Type I material that is approved under Subpart 164.018 of this chapter.

(c) The retroreflective material attached on each side of a life preserver must be divided equally between the upper quadrants of the side, and the material in each quadrant must be attached as closely as possible to the shoulder area of the life preserver.

PART 97—OPERATIONS

11. By adding a new § 97.15–70 to Part 97 to read as follows:

§ 97.15–70 Personal flotation device lights.

(a) Each personal flotation device light that has a non-replaceable power source must be replaced on or before the expiration date of the power source.

(b) Each replaceable power source for a personal flotation device light must be replaced on or before its expiration date and the light must be replaced when it is no longer serviceable.

SUBCHAPTER I-A—MOBILE OFFSHORE DRILLING UNITS

PART 108—DESIGN AND EQUIPMENT

12. By adding new paragraphs (e) and (f) to § 108.514 of Part 108 to read as follows:

§ 108.514 Life preservers.

* * * * *

(e) Each life preserver carried on a unit after June 30, 1980, must have a personal flotation device light that is approved under Subpart 161.012 of this chapter. Each light must be securely attached to the front shoulder area of a life preserver.

(f) Each life preserver carried on a unit after June 30, 1980, must have at least 200 sq. cm (31 sq. in.) of retroreflective material attached on its front side, at least 200 sq. cm on its back side, and at least 200 sq. cm of material on each of its reversible sides. The material must be Type I material that is approved under Subpart 164.018 of this chapter. The material attached on each side of a life preserver must be divided equally between the upper quadrants of the side, and the material in each quadrant must be attached as closely as possible to the shoulder area of the life preserver.

PART 109—OPERATIONS

13. By adding a new § 109.225 to Part 109 to read as follows:

§ 109.225 Personal flotation device lights.

(a) Each personal flotation device light that has a non-replaceable power source must be replaced on or before the expiration date of the power source.

(b) Each replaceable power source for a personal flotation device light must be replaced on or before its expiration date and the light must be replaced when it is no longer serviceable.

SUBCHAPTER Q—SPECIFICATIONS

PART 161—ELECTRICAL EQUIPMENT

14. By adding a new Subpart § 161.012 to Part 161 to read as follows:

Subpart 161.012—Personal Flotation Device Lights

Sec.

161.012–1 Scope.
161.012–3 Definitions.
161.012–5 Approval procedures.
161.012–7 Construction.
161.012–9 Performance.
161.012–11 Approval tests.
161.012–13 Production tests and inspections.
161.012–15 Markings.
161.012–17 Instructions.

Authority: 46 U.S.C. 375, 390b, 391a, 416, 481, 526p, 1454, and 1488; 49 U.S.C. 1655(b); 50 U.S.C. 198; and 49 CFR 1.46.

§ 161.012–1 Scope.

(a) This subpart prescribes construction and performance requirements, approval and production tests, and procedures for approving personal flotation device lights fitted on Coast Guard approved life preservers, bouyant vests, and other personal flotation devices.

§ 161.012–3 Definitions.

(a) As used in this subpart, "PFD" means Coast Guard approved personal flotation device.

(b) For the purpose of § 161.012–7, "storage life" means the amount of time after the date of manufacture of the power source of a light that the power source can be stored under typical marine environmental conditions on a vessel and still have sufficient power for the light to meet the requirements of § 160.012–9.

§ 161.012–5 Approval procedures.

(a) An application for approval of a PFD light under this subpart must be sent to the Commandant (G–MMT–3/83), U.S. Coast Guard, Washington, D.C. 20590.

(b) Each application for approval must contain—(1) the name and address of the applicant;

(2) two copies of plans showing the construction details of the light;

(3) a detailed description of the applicant's production testing program; and

(4) a laboratory test report containing the observations and results of approval testing.

(c) The Commandant advises the applicant whether the light is approved. If the light is approved, an approval certificate is sent to the applicant.

§ 161.012–7 Construction.

(a) Each light must be designed to be attached to a PFD without damaging the PFD or interfering with its performance.

(b) Each light and its power source must be designed to be removed and replaced without causing damage to the PFD.

(c) The storage life of the power source of a light must be twice as long as the period between the date of manufacture and the expiration date of the power source.

(d) Each light, prior to activation, must be capable of preventing leakage from its container of any chemicals it contains or produces.

(e) Each component of a light must be designed to remain serviceable in a marine environment for at least as long as the storage life of the light's power source.

(f) No light may have a water pressure switch.

(g) Each light must be designed so that when attached to a PFD, its light beam, at a minimum, is visible in an arc of 180 degrees above or in front of the wearer.

(h) Each light, including its power source, must fit into a cylindrical space that is 150 mm (6 in.) long and 75 mm (3 in.) in diameter.

(i) Each light, including its power source, must not weigh more than 225g (8 oz.).

(j) Each light that is designed to operate while detached from a PFD must have a lanyard that can be used to connect it to the PFD. The lanyard must be at least 750 mm (30 in.) long.

(k) Each light designed to operate while detached from a PFD must be capable of floating in water with its light source at or above the surface of the water.

§ 161.012–9 Performance.

(a) If a light is a flashing light, its flash rate when first activated, or within five minutes thereafter, must be between 50 and 70 flashes per minute.

(b) Each light must—(1) begin to shine within 2 minutes after activation; and

(2) within 5 minutes after activation be capable of being seen from a distance of at least one nautical mile on a dark clear night.

(c) Each light must be designed to operate underwater continuously for at least 8 hours at a water temperature of 15° ± 5°C (59° ± 9°F). However, if the light needs air to operate, underwater operation is required only for 50 or more seconds during each minute of the eight hour period.

(d) Each light must be designed to operate both in sea water and in fresh water.

(e) A light that concentrates its light beam by means of a lens or curved reflector must not be a flashing light.

(f) Each light must be designed to operate in accordance with this section after storage for 24 hours at a temperature of 65° ± 2°C (149° ± 4°F), and after storage for 24 hours at −30° ± 2°C (−22° ± 4°F).

§ 161.012–11 Approval tests.

(a) The approval tests described in this section must be conducted for each light submitted for Coast Guard approval. The tests must be conducted by a laboratory that has the equipment, personnel, and procedures necessary to conduct the approval tests required by this subpart, and that is free of influence and control of the applicant and other manufacturers, suppliers, and vendors of PFD lights.

(b) A sample light must be activated at night under clear atmospheric conditions. However, two lights must be used if the power source is water activated, and one light must be activated in fresh water and the other in salt water having the approximate salinity of sea water. The light, or lights, must begin to shine within 2 minutes after activation and, within 5 minutes after activation, must be seen from a distance of at least one nautical mile against a dark background.

(c) At least ten sample lights must be selected at random from a group of at least 25. Each sample light must be kept at a constant temperature of 65° ± 2°C (149° ± 4°F) for 24 hours. Each sample light must then be kept at a constant temperature of minus 30° ± 2°C (minus 22° ± 4°F) for 24 hours. Five samples must then be submerged in salt water having the approximate salinity of sea water and the five other samples must be submerged in fresh water. The temperature of the water must be 15° ± 5°C (59° ± 9°F). The lights must then be activated and left submerged for eight hours. However, if their power sources

need a supply of air to operate, the lights may be brought to their normal operating positions at the surface of the water for up to 10 seconds per minute during the eight hour period. At least nine of the ten lights must operate continuously over the eight hour period. If the lights are flashing lights, at least nine of ten must have a flash rate of between 50 and 70 flashes per minute when first activated or within five minutes thereafter.

(d) Individual tests must be conducted on a sample light to determine whether the light meets the requirements of § 161.012–7, except that technical data showing compliance with § 160.012–7(c) may be submitted with the application for approval in lieu of performing an individual test.

§ 161.012–13 Production tests and inspections.

(a) The manufacturer of approved lights must randomly select a sample of ten lights from each lot of lights produced. Each lot must not exceed 1,000 lights. At least nine of the ten lights, when tested in accordance with the test described in § 161.012–11(c), must meet the test criteria prescribed by that section. If less than nine lights meet the test criteria, another random sample of ten lights must be taken and tested. If less than nine of these lights meet the test criteria, none of the lights in the lot may be sold as Coast Guard approved equipment.

(b) The Coast Guard does not inspect lights approved under this subpart on a regular schedule. However, the Commandant may select samples and conduct tests and examinations whenever necessary to determine whether the lights are being manufactured in compliance with the requirements in this subpart.

§ 161.012–15 Markings.

(a) Each light manufactured under Coast Guard approval must be permanently and legibly marked with—(1) The manufacturer's name or trade mark that clearly identifies the model designation;

(2) The Coast Guard approval number assigned to light; and

(3) Instructions on how to activate the light.

(b) The power source of each light must be permanently and legibly marked with its date of manufacture and expiration date. Each date must include the month and year.

§ 161.012–17 Instructions.

(a) Each light must have instructions on how to attach it to a PFD in a manner that complies with § 161.012–7(a). However, in the case of lights that are to be attached by a PFD manufacturer, only one set of instructions need be provided for each shipment of lights.

(b) If a light is designed to be attached to a finished PFD, any attachment materials that are not supplied with the light must be clearly identified in the instructions. If a light is to be attached to a finished PFD by a PFD purchaser, any attachment materials not supplied with the light must be generally available for purchase.

(c) Each set of instructions must—(1) clearly identify the kind of PFD construction (for example fabric covered or vinyl dipped) to which the light can be attached; and

(2) not require penetration of the buoyant material of the PFD.

PART 164—MATERIALS

15. By adding a new Subpart 164.018 to Part 164 to read as follows:

Subpart 164.018—Retroreflective Material for Lifesaving Equipment

Sec.

164.018–1 Scope.
164.018–3 Classification.
164.018–5 Specifications and standards incorporated by reference.
164.018–7 Approval procedures.
164.018–9 Design requirements.
164.018–11 Approval tests.
164.018–13 Production inspections.

Authority: 46 U.S.C. 375, 390b, 391a, 416, 481, 526p, 1454 and 1488; 49 U.S.C. 1655(b); 50 U.S.C. 198; and 49 CFR 1.46

§ 164.018–1 Scope.

This subpart prescribes design requirements, approval tests, and procedures for approving retroreflective material used on lifesaving equipment.

§ 164.018–3 Classification.

The following types of retroreflective material are approved under this specification:

(a) Type I—Material used on flexible surfaces and rigid surfaces, except rigid surfaces that are continuously exposed.

(b) Type II—Weather resistant material used on continuously exposed rigid surfaces.

§ 164.018–5 Specifications and standards incorporated by reference.

(a) The following federal and military specifications and standards are incorporated by reference into this subpart:

(1) Federal Specification L–P–375 C (April 23, 1970), entitled "Plastic Film, Flexible, Vinyl Chloride", as amended by Amendment 2 of December 2, 1976.

(2) Federal Specification L–S–300 B (July 12, 1974), entitled "Sheeting and Tape, Reflective: Nonexposed Lens, Adhesive Backing."

(3) Federal Specification CCC–C–426 D (August 12, 1970), entitled "Cloth, Drill, Cotton."

(4) Federal Specification CCC–C–443 E (December 2, 1974), entitled "Cloth, Duck, Cotton (Single and Plied Filling Yarns, Flat)."

(5) Federal Test Method Standard 141a (September 1, 1965), entitled "Paint, Varnish, Lacquer and Related Materials; Methods of Inspection, Sampling and Testing." (Method 6141 "Washability of Paints", and Method 6142 "Scrub Resistance" as amended May 1, 1974).

(6) Federal Test Method Standard 370 (March 1, 1977), entitled "Instrumental Photometric Measurements of Retroreflective Materials and Retroreflective Devices."

(7) Military Specification MIL–C–17415 E (April 16, 1964), entitled "Cloth, Coated, and Webbing, Inflatable Boat and Miscellaneous Use", as amended by Amendment 5 of April 26, 1976.

(8) Military Specification MIL–R–21607 D (August 5, 1976), entitled "Resins, Polyester, Low Pressure Laminating, Fire-retardant."

(9) Military Specification MIL–C–43006 E (March 24, 1978), entitled "Cloth and Strip Laminated, Vinyl Nylon High Strength, Flexible."

(b) Federal and military specifications and standards may be obtained from Customer Service, Naval Publications, Forms Center, 5801 Tabor Ave., Philadelphia, Pa. 19120. These materials are also on file in the **Federal Register** library.

(c) Approval to incorporate by reference the materials listed in this section was obtained from the Director of the **Federal Register** on *June 14, 1979.*

(d) When changes are made to a specification or standard incorporated by reference into this subpart, the effective date for its use will be the effective date set by the issuing authority unless otherwise determined by the Coast Guard.

§ 164.018–7 Approval procedures.

(a) An application for approval of retroreflective material must be sent to the Commandant (G–MMT–3/83), U.S. Coast Guard, Washington, D.C. 20590.

(b) Each application for approval must contain—(1) the name and address of the applicant;

(2) two copies of plans or specifications of the material;

(3) a detailed description of the quality control procedures used in manufacturing the material; and

(4) a test report containing observations and results of approval testing conducted.

(c) The Commandant advises the applicant whether the retroreflective material is approved. If the material is approved, an approval certificate is sent to the applicant.

§ 164.018–9 Design requirements.

(a) Type I retroreflective material must be capable of being attached to lifesaving equipment either by sewing it to the equipment or by means of an adhesive. Type II material must be capable of being attached to lifesaving equipment either by mechanical fasteners or by an adhesive.

(b) The following information must be stated on retroreflective material or on the package in which it is supplied to a user:

(1) each surface to which the retroreflective material is designed to be attached.

(2) the instructions for attaching the material to each surface described in paragraph (b)(1) of this section.

(c) When retroreflective material designed for use with an adhesive is tested in accordance with the "adhesion" test method listed in § 164.018–11, the material must not peel for a distance of more than 5 cm (2 in.).

(d) When dry material is tested in accordance with the "reflective intensity" test method listed in § 164.018–11, the reflective intensity of the material must be equal to or greater than the values for reflective intensity listed in Table 164.018–9.

(e) When wet material is tested in accordance with the "reflective intensity during rainfall" test method listed in § 164.018–11, the reflective intensity of the material must be at least 90 percent of the values listed in Table 164.018–9.

(f) The reflective intensity of material after testing in accordance with the "resistance to accelerated weathering" test method listed in § 164.018–11 must be at least 50 percent of the values listed in Table 164.018–9.

(g) After testing in accordance with the "fungus resistance" test method listed in § 164.018–11, retroreflective material must not support fungus growth, and the reflective intensity of the material must be equal to or greater than the values for reflective intensity listed in Table 164.018–9.

(h) The reflective intensity of materials after testing in accordance with the "resistance to water immersion" test method described in § 164.018–11, must be equal to or greater than the values listed in Table 164.018–9, except that retroreflectivity is not required in the area extending outward 5 mm (0.2 inches) from each side of the cuts made in the material.

(i) The reflective intensity of material after testing in accordance with the "abrasion resistance" test method described in § 164.018–11(b)(2), must be at least 50 percent of the values listed in Table 164.018–9.

(j) After retroreflective material is tested in accordance with the "soil resistance and cleanability" test method described in § 164.018–11(b)(3) the material must not have any visible damage or permanent soiling.

(k) Except as provided in paragraphs (c) through (j) of this section, retroreflective material when tested in accordance with the test methods listed in § 164.018–11 must meet the requirements prescribed for those test methods in Federal Specification L–S–300.

Table 164.018–9—Reflective intensity

Divergence angle[1] (Observation angle)[2]	Incidence angle[1] (Entrance angle)[2]	Reflective intensity[1] (Specific intensity per unit area)[2]
0.2°	−4°	150
.2°	+30°	75
.2°	+45°	50
.5°	−4°	57
.5°	+30°	33
.5°	+45°	25
2.0°	−4°	2.5
2.0°	+30°	2.0
2.0°	+45°	1.0

[1] These terms are described in Federal Specification L–S–300.

[2] These terms are described in Federal Test Method Standard 370.

§ 164.018–11 Approval tests.

(a) Retroflective material submitted for Coast Guard approval must be tested in accordance with the following test methods described in Federal Specification L–S–300:

(1) Test conditions.

(2) Test panels.

(3) Adhesion test method using a 0.79 kg (1.75 lb.) test weight, except that one test panel must be immersed in distilled water in a covered container for 16 hours before the weight is applied and the other test panel must be immersed in salt water (4% NaCl by weight) in a covered container for 16 hours before the weight is applied. (This test method is required only for retroreflective material that is designed for use with an adhesive. If a particular test panel used in testing results in a test failure, the retroreflective material will not be approved for attachment to material of the type used as the test panel. The retroreflective material may nevertheless be approved for use with other types of material depending on the results of testing with the other panels. See paragraph (d) of this section for a listing of tests panels used.)

(4) Flexibility at standard conditions test method, except that when testing Type I material—

(i) the material must be unmounted;

(ii) a 1.5 mm (1/16-inch) mandrel must be used in place of the mandrel described in the test method; and

(iii) after testing at standard conditions, the material must be placed in a chamber at a temperature of −18°C (0°F) for at least 1 hour and then retested in the chamber at that temperature.

(5) Reflective intensity.

(6) Resistance to accelerated weathering test method and subtest methods "reflective intensity after accelerated weathering," "reflective intensity during rainfall," and "adhesion after accelerated weathering." (The "adhesion after accelerated weathering" test method is required only for materials designed for use with an adhesive. The "resistance to accelerated weathering" test method must be performed for 250 hours, if testing Type I material, and for 1000 hours if testing Type II material.)

(7) Resistance to heat, cold, and humidity.

(8) Fungus resistance.

(b) Retroreflective material submitted for approval must also be tested as follows:

(1) *Resistance to water immersion.* Two test panels are used. The test panels and test conditions must meet paragraphs (a)(1) and (a)(2) of this section. The retroreflective material on each test panel is cut with a sharp knife from each corner to the corner diagonally opposite so that an "X" is formed. The cuts must be made completely through the material to the metal panel. One panel is immersed in distilled water in a covered container. The other panel is immersed in salt water (4% NaCl by weight) in a covered container. After 16 hours in water, the panels are removed from the containers, rinsed of deposits, and dried. Reflective intensity values at the angles listed in Table 164.018–9 must be measured within 2 hours after removal of the panels from the water. When measuring the reflective intensity values, the area within 5 mm (0.2 in.) of either side of the "X" cuts, and within 5 mm of the cut edges of the material, must not be counted.

(2) *Abrasion resistance.* One test panel is used. The panel and test conditions must meet paragraphs (a)(1)

and (a)(2) of this section. The test apparatus must meet Federal Test Method Standard 141, Method 6142, except that the brush must be dry. One thousand brush strokes are applied to the material. The test panel is then wiped with a clean soft cloth. Thereafter, the reflective intensity of the area of the material in contact with the brush is measured at the angles listed in Table 164.018–9.

(3) *Soil resistance and cleanability.* One panel is used. The test panel and test conditions must meet paragraphs (a)(1) and (a)(2) of this section. A soiling medium is applied to the material as described in Federal Test Method Standard 141, Method 6141. The soiled area is then covered with a laboratory watch glass or similar device. After 24 hours, the material is uncovered and the soil medium wiped off with a clean, dry, soft cloth. The material is then wetted with mineral spirits and wiped with a cloth soaked in mineral spirits. Thereafter, it is washed with a 1 percent (by weight) solution of detergent in warm water and rinsed and dried with a clean, dry, soft cloth.

(c) Each measurement of reflective intensity required in paragraphs (a), (b)(1), and (b)(2) of this section must be made using either—

(1) the L–S–300 procedure for measuring reflective intensity; or

(2) the procedure for measuring specific intensity per unit area in Federal Test Method Standard 370, except that the test apparatus arrangement required in L–S–300 must be used.

(d) If material is designed for use with an adhesive, the "adhesion" test method required by paragraph (a)(3) of this section must be repeated using a 0.79 kg. (1.75 lb.) test weight and using each of the following materials as test panels in place of the aluminum test panels required by this test method:

(1) Smooth panel of cured polyester laminating resin meeting MIL–R–21607 (Types I and II material).

(2) Cotton drill (Type I material only) meeting CCC–C–426, or cotton duck meeting CCC–C–443 (Type I material only).

(3) Vinyl-nylon laminated cloth meeting MIL–C–43006 (Type I material only).

(4) Vinyl film meeting L–P–375 (Type I material only).

(5) Rubber coated cloth meeting MIL–C–17415 (Type I material only).

(e) Each flexible material listed in paragraph (d) of this section when used as a test panel must be bonded to a rigid backing.

(f) Test panel material listed in paragraph (d) must—

(1) be taken from an item of Coast Guard approved lifesaving equipment; or

(2) be certified by the manufacturer of the material that it meets the applicable specification in paragraph (d) of this section.

§ 164.018–13 Production inspections.

The Goast Guard does not inspect retroreflective material approved under this subpart on a regular schedule. However, the Commandant may select samples and conduct tests and examinations whenever necessary to determine whether retroreflective material is being manufactered in compliance with the requirements of this subpart.

SUBCHAPTER R—NAUTICAL SCHOOLS

PART 167—PUBLIC NAUTICAL SCHOOL SHIPS

16. By adding new paragraphs (c) and (d) to § 167.35–5 of Part 167 to read as follows:

§ 167.35–5 Life preservers.

* * * * *

(c) *Personal flotation device lights.* Each life preserver carried on a vessel engaged in ocean, coastwise, or Great Lakes service after June 30, 1980, must have a personal flotation device light that is approved under Subpart 161.012 of this chapter. Each light must be securely attached to the front shoulder area of a life preserver.

(d) *Retroreflective material.* Each life preserver carried on a vessel after June 30, 1980, must have at least 200 sq. cm (31 sq. in.) of retroreflective material attached on its front side, at least 200 sq. cm on its back side, and at least 200 sq. cm of material on each of its reversible sides. The material must be Type I material that is approved under Subpart 164.018 of this chapter. The material attached on each side of a life preserver must be divided equally between the upper quadrants of the side, and the material in each quadrant must be attached as closely as possible to the shoulder area of the life preserver.

17. By adding new paragraphs (c)(4) and (c)(5) to § 167.65–1 of Part 167 to read as follows:

§ 167.65–1 Station bills, drills, and log entries.

* * * * *

(c) * * *

(4) The master shall ensure that each personal flotation device light that has a non-replaceable power source is replaced on or before the expiration date of the power source.

(5) The master shall ensure that—

(i) each replaceable power source for a personal flotation device light is replaced on or before its expiration date; and

(ii) the light is replaced when it is no longer serviceable.

* * * * *

SUBCHAPTER T—SMALL PASSENGER VESSELS (UNDER 100 GROSS TONS)

PART 180—LIFESAVING EQUIPMENT

18. By adding a new § 180.25–20 to Part 180 to read as follows:

§ 180.25–20 Personal flotation device lights.

(a) Each life preserver carried on a vessel engaged in ocean, coastwise, or Great Lakes service after June 30, 1980, must have a personal flotation device light that is approved under Subpart 161.012 of this chapter.

(b) Each light required by this section must be securely attached to the front shoulder area of a life preserver.

(c) Vessels with Certificates of Inspection endorsed only for routes that do not extend more than 20 miles from a harbor of safe refuge are not required to comply with this section.

19. By adding a new § 180.25–25 to Part 180 to read as follows:

§ 180.25–25 Retroreflective material.

(a) Each life preserver carried on a vessel after June 30, 1980, must have at least 200 sq. cm (31 sq. in.) of retroreflective material attached on its front side, at least 200 sq. cm on its back side, and at least 200 sq. cm of material on each of its reversible sides.

(b) Retroreflective material required by this section must be Type I material that is approved under Subpart 164.018 of this chapter.

(c) The retroreflective material attached on each side of a life preserver must be divided equally between the upper quadrants of the side, and the material in each quadrant must be attached as closely as possible to the shoulder area of the life preserver.

PART 185—OPERATIONS

20. By adding a new § 185.25–25 to Part 185 to read as follows:

§ 185.25–25 Personal flotation device lights.

(a) The licensed operator shall ensure that each personal flotation device light that has a non-replaceable power source is replaced on or before the expiration date of the power source.

(b) The licensed operator shall also ensure that—

(1) each replaceable power source for a personal flotation device light is replaced on or before its expiration date; and

(2) the light is replaced when it is no longer serviceable.

SUBCHAPTER U—OCEANOGRAPHIC VESSELS

PART 192—LIFESAVING EQUIPMENT

21. By adding a new § 192.40–20 to Part 192 to read as follows:

§ 192.40–20 Personal flotation device lights.

(a) Each life preserver carried on a vessel engaged in ocean, coastwise, or Great Lakes service after June 30, 1980, must have a personal flotation device light that is approved under Subpart 161.012 of this chapter.

(b) Each light required by this section must be securely attached to the front shoulder area of a life preserver.

22. By adding a new § 192.40–25 to Part 192 to read as follows:

§ 192.40–25 Retroreflective material.

(a) Each life preserver carried on a vessel after June 30, 1980, must have at least 200 sq. cm (31 sq. in.) of retroreflective material attached on its front side, at least 200 sq. cm on its back side, and at least 200 sq. cm of material on each of its reversible sides.

(b) Retroreflective material required by this section must be Type I material that is approved under Subpart 164.018 of this chapter.

(c) The retroreflective material attached on each side of a life preserver must be divided equally between the upper quadrants of the side, and the material in each quadrant must be attached as closely as possible to the shoulder area of the life preserver.

PART 196—OPERATIONS

23. By adding a new § 196.15–70 to Part 196 to read as follows:

§ 196.15–70 Personal flotation device lights.

(a) Each personal flotation device light that has a non-replaceable power source must be replaced on or before the expiration date of the power source.

(b) Each replaceable power source for a personal flotation device light must be replaced on or before its expiration date and the light must be replaced when it is no longer serviceable.

(46 U.S.C. 375, 390b, 391a, 416, 481, 526p, 1454, and 1488; 49 U.S.C. 1655(b); 50 U.S.C. 198; and 49 CFR 1.46.)

Dated: June 20, 1979.

J. B. Hayes,

Admiral, U.S. Coast Guard Commandant.

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